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Game Operating Platform's Pricing Model and the Influencing Factors of Price - Based on the Bilateral Market Perspective

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Abstract

In this paper, we used the theory of bilateral market analysing the pricing model platform and influencing factors for game operators .we pointed out that the game operating platform has the typical characteristics of the bilateral market, showing a significant positive network externalities. Through the establishment of the pricing model of the game operating platform under the monopoly and competition cases, the article analysed its' pricing issues, and we got that the game developers and players' price elasticity of demand, the size of the user's network externalities from the other side, the market competition of game operations, the game operating platform's bilateral costs to provide products or services and competitive operating platform's degree of difference in providing products or services are the major factors in the game operating platform pricing.

Key words: Game operator platform; Bilateral market; Pricing model; Influencing factors

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INTRODUCTION

The rapid development of online games is causing concern of society, according to the 2008 China Game Industry Annual Conference issued the "2008 China Game Industry Report Summary" shows that in 2008 China's online games users has reached 4936 million, the actual market sales revenue reached 18.38 billion yuan, an increase over 76.6% to the same period 2007 (China Game Industry Report Summary, 2008). International Data Corporation (IDC) predicts that by 2012 China's online game revenue will reach 26.23 billion yuan, 2007-2012 compound annual growth rate will reach 19.9%, the online game industry is considered a sunrise industry with unlimited potential. This mainly relies on the network, IT technology's new industry exactly how to run how to price in the market, how to value distribution, that is not only management need to understand, but also important for the online games value chain participants to achieve multi- self-value, and is the basic approach for achieving the effective value chain management. In this paper, we use the hot spots in recent years—bilateral market to analyze the economic attributes of game operating platform. Through the optimal pricing analysis online game operating platform under monopoly and competition cases, we have got the main factors affecting the pricing of operating platform, and provide a unique perspective for the analysis of pricing in online game industry market and competitive equilibrium theory.

1. THE BILATERAL MARKET OF GAME OPERATING PLATFORM

After a decade of development, the network game market chain has been formed, as shown in Figure 1. Developer is in the upstream of the industry chain, which is mainly responsible for R&D production and the operation of online games after commissioning; Operators is mainly for providing hardware, bandwidth, platform maintenance, customer service and other services; Channel plays as a game operator' market seller role, it is responsible for the online game software, point card

and other sales. Operational support provided for the game operators to provide network operators, broadband, equipment, or regional games area, internet area and other services. The major domestic carries support of the business are: (1) telecom and ISP; (2) IDC; (3) ICP; (4) other IT companies: including PC vendors, server vendors, system security vendors, software vendors and other platform.

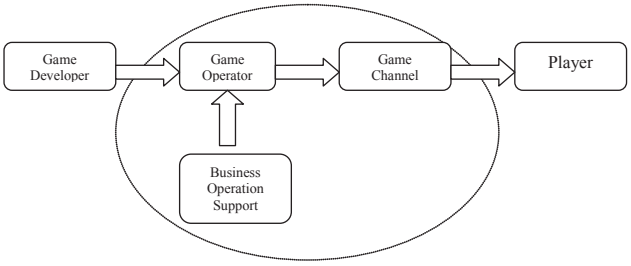

Figure 1
Online Game Industry Chain

It can be seen that in the network game industry game operators is the leading value-added, in some sense, the game channel and business operators' operational support are playing a marketing and technical support role. From the perspective of industry chain, the game operating platform is in the middle and has the following two characteristics:

1.1 Typical Operating Platform Game of the Bilateral Marke

The typical bilateral market involves buyer, seller and third parties (platform). Shown in Figure 1, for the game industry, there is the bilateral market structure involving game developer (seller), the player (buyer) and the game operators (game operating), in which game operating platform is the core to achieve transaction.Among them, the developers and players as two types of users for the game operating platform, have the relationship of needing each other. That is developers need players' concern as much as possible, and gamers want to see the game alternative as much as possible. Therefore to convince the buyer using a platform ,it must convince the seller, and make them believe that there will be buyers in the market, and vice verse (Caillaud & Jullien, 2003).

1.2 Network Externalities Between Bilateral of Game Operating Platform

Game operating platform as the typical bilateral market has significant externalities, such external nature performance is: positive externalities between bilateral members. That is the number of one side's users increases with the number of other side users. In the actual operations' performance, the more game developers join into the platform, it is more likely to attract players, then there will be more developers willing to carry out transactions through the platform.

2. PRICING MODEL OF GAME OPERATING PLATFORM

2.1 Basic Assumptions

First, when both sides have at least one common platform, the deal will happen. That is there is at least one platform on which both sides are willing to transact.

Second, economic value comes from the end user pairs buyer (denote as B) and seller (denote as S),such transactions are coordinated through the platform, the unit marginal cost of transactions of the platform are recorded as $c \geq 0$. And the cost of operating platform provided services to game developers and players were F_S and F_B, where $F_S=c_S N_S$ and $F_B=c_B N_B$.

Third, buyers and sellers are heterogeneous, that is their benefits from the transaction increasing with the number of both sides participants and it is private information. When they traded through the platform i, the buyer's utility is denoted by U_i^B, the seller's utility is denoted by U_i^S ,and both of them are linear distribution.

Four, game operating platform charged P_S and P_B for their services or products provided to developers and players.

Five, the externalities of unit play (game developer) access to the platform brings to game developer (play) denoted by a_S (a_B).

Six, the number of each side access to the platform denoted as N_S and N_B, and $N_S=\Phi_S(U^S)$, $N_B=\Phi_B(U^B)$, in which $\Phi_S(.)$ and $\Phi_B(.)$ is increasing function, that is the number of each side accessing to the platform increasing with its' utility.

2.2 Platform Monopoly Pricing Model

Monopoly pricing is that only one game operating platform in the market, all the game developers and players can only trade through this platform. Although such extreme situations occur in the real market is difficultly, but in the perspective of the economic analysis paradigm, this is the starting point for other analysis. This article also start to analyze the situation of monopoly.

From the assumptions above, S is on behalf of game developers, B is on behalf of player, while there have N_S game developer and N_B game player. For the network externalities between game developer and player, the utility of both parties is relative to their number, then under the monopoly platform, developers and players' utility function are:

$$U^S=a_S(N_B-P_S),\ U^B=a_B(N_S-P_B) \quad (1)$$

As the game operating platform's positive network externalities, there are $a_S>0$, $a_B>0$.

The profit function of game operating platform is:

$\prod = N_S(P_S-F_S)+N_B(P_B-F_B)$

By the formula (1) we can get $P_S=a_S N_B-U^S$, $P_B=a_B N_S-U^B$, also by the assumption (6) we can get $N_S=\Phi_S(U^S)$, $N_B=\Phi_B(U^B)$, put them into the operating platform's profit

function, $\prod$ can be expressed as a function of U^S and U^B:

$$\prod(U^S, U^B)=\Phi_S(U^S)\,[a_S\Phi_B(U^B)-U^S-F_S]+\Phi_B(U^B)\,[a_B\Phi_S(U^S)-U^B-F_B] \quad (2)$$

From the conditions that the platform get the max profit is that the partial derivatives of $\prod$ to U^S and U^B are zero, we can get:

$$U^S=(a_S+a_B)\Phi_B(U^B)-F_S-\frac{\Phi_S(U^S)}{\Phi_S'(U^S)},$$

$$U^B=(a_S+a_B)\Phi_S(U^S)-F_B-\frac{\Phi_B(U^B)}{\Phi_B'(U^B)}$$

That is :

$$U^S=(a_S+a_B)N_B-F_S-\frac{\Phi_S(U^S)}{\Phi_S'(U^S)},$$

$$U^B=(a_S+a_B)N_S-F_B-\frac{\Phi_B(U^B)}{\Phi_B'(U^B)} \quad (3)$$

According to (1) and (3), the monopoly game operating platform's maximizing price structure is:

$$P_S=F_S-a_BN_B+\frac{\Phi_S(U^S)}{\Phi_S'(U^S)}$$

$$P_B=F_B-a_SN_S+\frac{\Phi_B(U^B)}{\Phi_B'(U^B)} \quad (4)$$

We can see that compared with single market profit-maximizing monopoly price, the pricing of the monopoly game operating platform to game developer(player) must to versus externalities a_BN_B (a_SN_S) which is coming from the relative side to player(game developer). That is as a bilateral market, the monopoly game operating platform's pricing for game developer and player ought to not only consider the demand price elasticity of both side and the cost for providing service for them, but also take the bilateral network externality issues into account. If the player's demand price elasticity brings to the game developer externalities a_B is large enough, the platform may charge the player below cost or even zero prices or negative prices.

2.3 Platform Competitive Pricing Model

The so-called competitive pricing model means the price structure from which platform can get maximize profits when there is competition. For simplicity, in this paper we only consider the existence of two game operating platform (i=1, 2) participating in market competition. We use $U_i^S(U_i^B)$ to denote the utility of game developer (play) getting access to platform. Accordingly, the platform charge P^i_S and P^i_B for game developer and player respectively. If player and developer are multi-homing (that is both accessing to two platform), then the operating platform for trading is uncertainty. To simplify the model, we assume that game developer and player are single-homing, that is they can only choose one platform to trade. The utility function for developer and player accessing to platform can be expressed as:

$$U_i^S=a_SN^i_B-P^i_S,\ U_i^B=a_BN^i_S-P^i_B\ (i=1,2) \quad (5)$$

In which N^i_S and N^i_B respectively denoted the number of game developer and player joining to the platform. Using Hotelling price competition model to study the competition between game operating platform, and assuming ds and d_B (ds, d_B>0) respectively denote the different parameters for the service that the platform provided to developer and player, and then assumed that the different parameters and game developer and player's distance to game operating platform is the cost's affecting factor for developer and player accessing to platform. Then according to the Hotelling competition model, if a game developer in the $\bar{x}$ distance access the platform's utility is indifference, that can be expressed as:

$a_S N^i_B-P^i_S-ds\,\bar{x}=a_SN^j_B-P^j_S-ds(1-\bar{x})$ (i,j=1, 2且i≠j)

So

$$\bar{x}=\frac{1}{2}+\frac{a_SN^i_B-P^i_S-(a_SN^j_B-P^j_S)}{2ds} \quad (6)$$

Also

$$N^i_S=p(x\le x)=x=\frac{1}{2}+\frac{a_SN^i_B-P^i_S-(a_SN^j_B-P^j_S)}{2ds}$$

As game developer can choose only one game operating platform to access, that is $N^j_B=1-N^i_B$, so there is:

$$N^i_S=\frac{1}{2}+\frac{a_S(2N^i_B-1)-(P^i_S-P^j_S)}{2ds} \quad (7)$$

Similarly available:

$$N^i_B=\frac{1}{2}+\frac{a_B(2N^i_S-1)-(P^i_B-P^j_B)}{2d_B} \quad (8)$$

By (7) we can obtain that an additional audience access each platform i, the platform can attract a_S/ds game developer jointing into platform, as the same reason from (8) we can obtain that additional game developer access each platform i, the platform can attract a_B/d_B player jointing into the platform. Take equations (7) and (8) together we can see:

$$N^i_S=\frac{1}{2}+\frac{1}{2}\frac{a_S(P^j_B-P^i_B)+d_B(P^j_S-P^i_S)}{ds\,d_B-a_S\,a_B}$$

$$N^i_B=\frac{1}{2}+\frac{1}{2}\frac{a_B(P^j_S-P^i_S)+d_S(P^j_B-P^i_B)}{ds\,d_B-a_S\,a_B}$$

Substitute the N^i_S and N^i_B into the game operating

platform i's profit function $\prod = N^i_S (P^i_S - F_S) + N^i_B (P^i_B - F_B)$, so as to the same basis on the conditions for profit maximization, find P^i_S and P^i_B's first-order partial derivative, and let it to be zero, according to the Hotelling competition model's final result of the competition balance, that is $P^1_S = P^2_S$, $P^1_B = P^2_B$, $N^1_S = N^2_S = 1/2$, $N^1_B = N^2_B = 1/2$, it can be drawn from the competitive that game operating platform for game developer and player are priced at:

$$P_S = F_S + d_S - a_B,\ P_B = F_B + d_B - a_S \quad (9)$$

From (9) we can see that competitive game operating platform's pricing for game developer and player have to consider the cost of providing service to both sides, it also have to consider the differences degree and network externalities between two-sided consumers, and also other factors. If competitive game operating platform 1 increase one side consumer's price, it will be likely encourage the consumer change to platform 2, and the network externalities between game developer and player will affect the other side consumer's transition. As a competitive game operating platform market, each platform on bilateral market prices' plus capacity is restricted. Therefore, relative to the monopoly platform, the competitive platform's ability of market plus is weaker, correspondingly the price will be lower.

3. THE MAIN AFFECTING FACTORS FOR GAME OPERATING PLATFORM PRICING

Based on the above two models' analysis, we know that game operating platform's price level and price structure is affected by many factors, which is mainly include: the cost of providing services (products), the price elasticity of demand for each side, the size of network externalities created by the relative edge, the number of consumers on each side and the services' (products') degree of differentiation provided by the platform.

3.1 The Cost of Service (Product)

Whether monopolistic or competitive operating platform game platform, they must take the cost for providing service or product to game developer and player into their pricing account. The cost of operating platform mainly include: hardware, broadband and other equipment costs, platform services, customer service and other service costs, personal costs, the cost of the channel and other agent agents. Most of these costs are for game software developers, therefore from the point of cost view, the pricing of the platform for game developer is generally higher than their pricing for the players.

3.2 The Demand Elasticity for Both Accessing Platforms' Sides

The elasticity of demand on both sides is an important determinant of the game operating platform' service pricing. Armstrong (2006) believe that a given size of the market is an affecting factor for the other's demand elasticity, So the number of buyers on the incumbent increases, the platform charges the buyer will naturally increase, and the charge for the seller will decline; attractive seller can obtain a higher indirect benefits through the increasing number of buyer.

However, no matter how the game operating platform is pricing, as long as there is no demand of the platform's one side, then the other side's demand will disappear. This requires operating platform try to convene the bilateral users to deal on the platform. In the process of convening, platform's pricing structure is the key factor. Which in the real economy the common approach is to get buyer's (player's) large number of users through the open game beta, let them play games for free, or even pay for their platform access, such as giving the game equipment, to encourage the enthusiasm of benefit side involving in the platform, Caillaud and Jullien (2003) called such strategy as "divide and conquer". Trough this strategy, the game operating platform can cultivate one or both user, to achieve successful operation of the platform.

3.3 Network Externalities Created by the Relative Side

If one of the platform's two side can create significant externalities for the other, generally positive externality, then by lowering the price of one side will not only attract more same edge customers, but also can attract more consumers of other side to joint into the platform.

3.4 The Number of Relative Consumers

Derived from the monopoly model of the final results we can see, the pricing of the platform for one side is affected by the number of the other side's consumer. In the bilateral market environment, price and quantity are endogenous variables, and they are determined mutually. Therefore the distribution of price structure between the bilateral parties is the dynamic interaction with the number of relative consumers. Studying the decision role of price on number one-way static, and ignoring the inverse dynamic role of consumer's number or the volume of distribution on price distribution will lead to unreasonable conclusions in bilateral market.

3.5 The Degree of Difference on Platform's Products (Services)

In a competitive bilateral market environment, platform pricing also need to concern the different products or services which alternative competitive game operating platform provided to game developer and player, that is the alienation degree of platforms' product. The different degree of products or services provided by the platform will affect developer and player's decision-making for accessing platform or not, which also affect the number of consumers on both sides, and ultimately it will affect the pricing of the platform. In a competitive environment, compared with other platforms if the platform a higher degree of differentiation for their products or services, the platform will have relatively greater market power, the plus of price from platform on

game developer and player will be higher. If the degree of difference about platform for developer (player) is small, it will lead to more intense competition between platforms. In order to achieve scale on both sides, it could eventually lead to the price decline on this side, or even lead to the price decline of the other side.

CONCLUSION AND OUTLOOK

(1) Conclusions

In this paper, we use bilateral market theory to study the game operating platform's pricing model and its' pricing factors, in hoping of providing a new theoretical research perspective for game industry. By building pricing models of platform in monopoly and competitive case, we have analysed the way of the game operating platform pricing and the affecting factors of its' price structure determination, and got the following conclusions:

First, to achieve profit maximization of operating platform, the game operating platform ought to not only consider the over all price level (price level) that it charged from game developer (seller) and player (buyer), what is more important is to consider the price distribution (price structure) between developer and player.

Second, the pricing of game operating platform to developer (player) should not only consider the cost of providing products or services for this side and the need of consumers, what is more important is to consider the network externalities issues between developer and player.

Third, the pricing factors of game operating platform mainly including: the market competition situation of game operating platform, the cost of products or services provided from platform to game developer and player, the price elasticity of demand from game developer and player respectively, the size of the network externalities of game developer (player) to player (game developer) , the number of platform's two side and the degree of difference for products or services provided by the platform in competitive market environment.

Four, Compared with the single market, the phenomenon of cross-subsidies (usually game developer subsidy player) between game developer and player in game operating platform is the normal pricing phenomenon in operating platform. The reason for this cross-subsidy occurs is that the game operating platform want to solve the "Chicken and egg" problem.

(2) Outlook

This article just analyzed the game operating platform's pricing problem in the case of monopoly and competition, and have not involved the impact of platform's pricing methods on its pricing. For convenience, we assumed both sides of the platform is single-homing in our study of competitive game operating platform. In order to study the actual operating conditions wider, we need to put our effort to the following aspects:

First, expand the competitive environment. Monopoly and competition are just two extreme cases, and competitive markets can also be subdivided into oligopoly, duopoly, monopolistic competition and perfect competition. As for game industry, its market concentration is relatively high, its pricing analysis can be extended to the case of monopolistic competition, and that will be more close to the current status of the industry.

Second, the research of multi-homing consumers' access into platform. From the realistic point of view, the seller (game developer) behaved single-homing trend in game operating platform, in general game developer tends to joint into single platform, but for buyer (player) side it showed strong multi-homing trend. Its specific performance is the player have the trend of selecting several games preference. So the model of seller single-homing and buyer multi-homing can explain the actual characteristics of game industry more appropriately.

Third, from the point of current view for game operating platform, the platform often charge the seller a one-time accessing fees (registration fees), while charging the buyer in the form of time fees (transaction fees). Therefor in the game operating platform, charging one side a registration fee while charging the other side the transaction fee, this pricing model is the more practical operating way.

Four, there is an urgent need to strengthen empirical research. In the point of current study path view, the study of platform's pricing model is still in the theoretical stage, and it is also need carefully consider about the extent of the theoretical model based on rigorous assumption to explain the practical problems. Therefore basing on actual data and verification of the theoretical model is the direction for the platform's corporate behavior strategy research.

Five, expand competitive strategy study for game industry. For game operating platform, pricing is just one way of platform's competition strategy. For platform the key to success is how to attract as many consumers as possible to trade on the platform in the bilateral market environment, usually platform can take vertical differentiation, bundling, interoperability and other ways to solve the problem, which involves platform competitive strategy in two-sided market environment. Therefore I believe taking the pricing strategy of platform enterprise as a starting point for studying the platform's strategic behavior extensively is the fundamental to guide business' practices.

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